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Socio-economic differences in cardiovascular disease risk factor prevalence in people with type 2 diabetes in Scotland: a cross-sectional study

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What's new?

- Socio-economic deprivation is associated with increased risk of cardiovascular disease in people with diabetes.
- This study, using a national database of quarter of a million people, found that socio-economic deprivation is strongly positively associated with smoking and obesity, modestly positively associated with above-target HbA_{1c}, and modestly negatively associated with above-target cholesterol, with no evidence of an association with above-target blood pressure.
- Inequalities appear to have widened over time.
- Our findings may enable more effective interventions to reduce these inequalities by targeted approaches in subgroups of the population.

Abstract

Aim To describe the association between socio-economic status and prevalence of key cardiovascular risk factors in people with type 2 diabetes in Scotland.

Methods A cross-sectional study of 264 011 people with type 2 diabetes in Scotland in 2016 identified from the population-based diabetes register. Socio-economic status was defined using quintiles of the area-based Scottish Index of Multiple Deprivation (SIMD) with quintile (Q)1 and Q5 used to identify the most- and least-deprived fifths of the population, respectively. Logistic regression models adjusted for age, sex, health board, history of

cardiovascular disease and duration of diabetes were used to estimate odds ratios (ORs) for Q1 compared with Q5 for each risk factor.

Results The mean (SD) age of the study population was 66.7 (12.8) years, 56% were men, 24% were in Q1 and 15% were in Q5. Crude prevalence in Q1/Q5 was 24%/8.8% for smoking, 62%/49% for BMI ≥ 30 kg/m², 44%/40% for HbA_{1c} ≥ 58 mmol/mol (7.5%), 31%/31% for systolic blood pressure (SBP) ≥ 140 mmHg, and 24%/25% for total cholesterol ≥ 5 mmol/l, respectively.

ORs [95% confidence intervals (CI)] were 3.08 (2.95–3.21) for current smoking, 1.48 (1.44–1.52) for BMI ≥ 30 kg/m², 1.11 (1.08–1.15) for HbA_{1c} ≥ 58 mmol/mol (7.5%), 1.03 (1.00–1.06) for SBP ≥ 140 mmHg and 0.87 (0.84–0.90) for total cholesterol ≥ 5 mmol/l.

Conclusions Socio-economic deprivation is associated with higher prevalence of smoking, BMI ≥ 30 kg/m² and HbA_{1c} ≥ 58 mmol/mol (7.5%), and lower prevalence of total cholesterol ≥ 5 mmol/l among people with type 2 diabetes in Scotland. Effective approaches to reducing inequalities are required as well as reducing risk factor prevalence across the whole population.

<H1>Introduction

Low socio-economic status is associated with excess risk of cardiovascular disease (CVD), a major cause of mortality and morbidity in people with and without diabetes, although incidence and mortality are decreasing in many countries [1]. Socio-economic deprivation further increases the elevated risk of CVD among people with diabetes compared with people without diabetes [2]. Much of the disparity in CVD risk can be explained by the higher prevalence of CVD risk factors in people of lower socio-economic status compared with people of higher socio-economic status [3,4]. Understanding risk factor patterns among people with diabetes is important to address health inequalities [5].

Prevalence of type 2 diabetes and incidence of diabetes complications are also inversely associated with socio-economic status. Mortality as a result of CVD complications of diabetes is higher in more deprived populations [6]. In the USA, these inequalities are largely explained by differences in CVD risk factor prevalence and access to and use of healthcare services [7].

Previous research in Scotland describing socio-economic inequalities in CVD risk factor prevalence in people with diabetes includes studies of almost 50 000 people in Glasgow and Lothian in 2005–2006 [8], around 10 000 people in Tayside in 2006 [9], and ~ 15 000 people in Ayrshire and Arran in 2008–2009 [10]. No previous studies have described the association between socio-economic status and CVD risk factor prevalence in people with diabetes across the whole of Scotland. In addition, the Quality and Outcomes Framework (QOF), which included payment based on performance on clinical and organizational measures including those for people with diabetes in Scotland between 2004 and 2017 [11,12], and the ban on smoking in public places introduced in 2006 may have affected inequalities in CVD risk factor prevalence among people with diabetes. Some evidence indicates that QOF may have led to improvements in inequalities in risk factor patterns for chronic diseases [13].

However, as people who refused to attend clinics could be excluded from QOF target data, and such exclusions were more common in more deprived areas, inequalities may be underestimated from QOF data [14]. By contrast, other authors comment that QOF has not had a significant effect on health inequalities [15], and that QOF may have contributed to widening inequalities [16].

The Scottish Index of Multiple Deprivation (SIMD) provides an area-based measure of socio-economic status. In the 2016 SIMD, Scotland was split into 6976 geographical data zones with an average of 760 residents in each zone [17]. SIMD scores were calculated for each

data zone based on seven domains (current income, employment, health, education, skills and training, geographic access to services, crime, and housing) [18].

The aim of this study was to describe the association between socio-economic status and prevalence of key CVD risk factors in people with type 2 diabetes in contemporary Scottish data.

The specific objectives were to: (1) determine the crude prevalence of CVD and CVD risk factors, stratified by SIMD quintile; (2) estimate odds ratios (ORs) for CVD risk factor prevalence by individual risk factor and SIMD quintile, adjusted for potential confounders; and (3) compare the results with data from previous studies.

<H1>Participants and methods

<H2>Design and cohort selection

A cross-sectional study was performed using a 2016 research extract of the dynamic population-based diabetes register in Scotland (Scottish Care Information–Diabetes; SCI-Diabetes), that had been linked to national hospital admission records (see <https://www.ndc.scot.nhs.uk/National-Datasets/data.asp?SubID=5> for more detail). The diabetes register includes demographic, clinical and laboratory data derived from daily downloads of data from all primary care practices and diabetes clinics in hospitals in Scotland. Permission for the research was obtained from the Scottish multicentre research ethics committee (reference 11/AL/0225) and the Privacy Advisory Committee (reference 33/11).

People with diagnosed type 2 diabetes in Scotland who were alive on 30 June 2016 were included. We excluded people with missing data for SIMD (0.2%) and people aged > 100 years (0.05%), leaving 264 011 individuals in the main analysis.

<H2>Variables

socio-economic status was defined using quintiles of SIMD referred to as Q1, Q2, Q3, Q4 and Q5, where Q1 and Q5 represent the most- and least-deprived fifths of the population, respectively.

CVD risk factors were defined from all records closest to 30 June 2016 as: current smoker, obesity ($\text{BMI} \geq 30 \text{ kg/m}^2$), $\text{HbA}_{1c} \geq 58 \text{ mmol/mol}$ (7.5%), systolic blood pressure (SBP) $\geq 140 \text{ mmHg}$ and total cholesterol $\geq 5 \text{ mmol/l}$. Extreme values, defined as $\text{HbA}_{1c} < 30 \text{ mmol/mol}$ (4.9%), $\text{HbA}_{1c} > 200 \text{ mmol/mol}$ (20%), $\text{BMI} < 15 \text{ kg/m}^2$, $\text{BMI} > 80 \text{ kg/m}^2$, cholesterol $< 2.4 \text{ mmol/l}$, and SBP $< 100 \text{ mmHg}$, were removed and treated as missing. No risk factor had more than 3.6% missing/implausible values (Fig. S1).

History of CVD was defined broadly using the International Statistical Classification of Diseases and Related Health Problems (ICD)-9 codes 390–459 or ICD-10 codes I00–I99 in hospital admission records in Scotland that date back to 1981.

<H2>Statistical analysis

R (version 3.5.1) and SPSS (version 24) were used for statistical analysis.

One-way analysis of variance (ANOVA) tests for trend were used to test for differences between quintiles in continuous variables and chi-squared tests for trend were used to test for differences between quintiles in categorical variables in the descriptive analysis. Logistic regression models were used to generate ORs and 95% confidence intervals (CI) for each quintile compared with Q5 for each risk factor, adjusted for age as a continuous variable, sex, health board as a categorical variable (with smaller health boards combined to form 10 categories), history of CVD and duration of diabetes as a continuous variable. Further adjustment for BMI as a continuous variable and/or smoking (as current and never/ex-smoker categories) was performed for HbA_{1c} . Potential interactions between SIMD and age and sex were explored. Adjusted OR stratified by health board were compared with those of previous Scottish regional studies. Adjustment factors were: age, sex, history of CVD and health board

for the Glasgow and Lothian study [8]; age, sex, duration of diabetes and BMI for the Tayside study [9]; and age, and BMI for cholesterol ≥ 5 mmol/l with sex stratification for the Ayrshire and Arran study [10].

<H1>Results

<H2>Participants and data completeness

The study cohort included 264 011 people with type 2 diabetes in Scotland who were alive on 30 June 2016. Figure S1 describes the cohort selection and the distribution of missing/implausible data. All available risk factor data were used in the analyses and only 4.9% of individuals had a missing value for one or more risk factors. Patterns of missing data differed slightly by deprivation; 5.3% had one or more risk factor missing in Q1 (the most deprived quintile), 4.8% in Q2/Q3/Q4, and 4.4% in Q5 (the least deprived quintile).

<H2>Descriptive data

Some 24% ($n = 62\,384$) of the study population were in Q1 and 15% ($n = 39\,742$) were in Q5. Characteristics of the study participants by socio-economic status are reported in Table 1. Compared with Q5, people in Q1 were younger, included a higher proportion of women, had shorter duration of diabetes and were more likely to have a history of hospital admission with CVD ($P < 0.001$ for all characteristics).

<H2>Main results

Crude overall prevalence of CVD risk factors was: 16% for smoking, 58% for BMI ≥ 30 kg/m², 42% for HbA_{1c} ≥ 58 mmol/mol (7.5%), 32% for SBP ≥ 140 mmHg and 25% for total cholesterol ≥ 5 mmol/l. Crude prevalence of CVD risk factors by SIMD quintile is reported in Table 1. Smoking, BMI ≥ 30 kg/m² and HbA_{1c} ≥ 58 mmol/mol (7.5%) were more common among more-deprived populations, and SBP ≥ 140 mmHg and total cholesterol ≥ 5 mmol/l tended to be more common in the middle socio-economic status quintile groups.

Adjusted ORs for each risk factor for Q1 compared with Q5 are shown in Fig. 1. ORs (95% CI) for Q1 compared with Q5 were 3.08 (2.95–3.21) for current smoking, 1.48 (1.44–1.52) for BMI ≥ 30 kg/m² and 1.11 (1.08–1.15) for HbA_{1c} ≥ 58 mmol/mol (7.5%). For HbA_{1c} ≥ 58 mmol/mol (7.5%), additional adjustment for BMI and/or smoking had little effect (OR between 1.09 and 1.12). By contrast, there was little or no association between socio-economic status and SBP ≥ 140 mmHg (OR 1.03, 95% CI 1.00–1.06), and there was an inverse association with cholesterol ≥ 5 mmol/l (OR 0.87, 95% CI 0.84–0.90). Adjusted ORs for each risk factor for Q2, Q3 and Q4 compared with Q5 are shown in Table 2 and show approximately linear trends.

<H2>Interactions

Figure 2 describes interactions between socio-economic status and age and sex. The main interactions are reported below.

<H3>Age

Inequalities in HbA_{1c} ≥ 58 mmol/mol (7.5%) appear to be in the reverse direction in the group aged ≥ 75 years (Q1 compared with Q5: OR 0.93, 95% CI 0.88–0.98) compared with other age groups (P for interaction <0.001) (Fig. 2c). The OR for cholesterol ≥ 5 mmol/l was lower in the ≥ 75 -year-old age group (0.74, 95% CI 0.69–0.80) compared with other age groups ($P < 0.001$) (Fig. 2e). Inequalities in BMI ≥ 30 kg/m² appear to increase with increasing age ($P < 0.001$) (Fig. 2b). No other interactions between age and socio-economic status were identified (for interaction with current smoking $P = 0.953$; for SBP ≥ 140 mmHg $P = 0.736$) (Fig. 2a,d).

<H3>Sex

Inequalities by socio-economic status in current smoking were larger in females (OR 3.53, 95% CI 3.29–3.79) compared with males (OR 2.82, 95% CI 2.67–2.98) (P for interaction < 0.001) (Fig. 2a), as were inequalities in cholesterol ≥ 5 mmol/l (OR 0.82, 95% CI 0.79–

0.86 and OR 0.91, 95% CI 0.87–0.96, respectively) ($P < 0.001$) (Fig. 2e). Inequalities by socio-economic status in $\text{HbA}_{1c} \geq 58$ mmol/mol (7.5%) were larger in males (OR 1.15, 95% CI 1.11–1.20) compared with females (OR 1.06, 95% CI 1.01–1.11) ($P < 0.001$) (Fig. 2c), as were inequalities in $\text{SBP} \geq 140$ mmHg (OR 1.04, 95% CI 1.00–1.08 and 1.02, 0.97–1.06 for males and females respectively; $P = 0.011$) (Fig. 2d). There was no evidence of an interaction between sex and socio-economic status for $\text{BMI} \geq 30$ kg/m² ($P = 0.095$) (Fig. 2b).

<H2>Comparisons with previous Scottish studies

Patterns of inequalities in HbA_{1c} , SBP and BMI appear to have remained stable over time. In absolute terms, crude prevalence of $\text{BMI} \geq 30$ kg/m² has increased, for example from 48% in 2005–2006 to 54% in 2016 in Glasgow, and from 54% in 2008–2009 to 59% in 2016 in Ayrshire and Arran. The increase in prevalence over time has been similar by socio-economic status, for example from 51% in 2005–2006 to 59% in 2016 in Q1 and 38% in 2005–2006, to 44% in 2016 in Q5 in Glasgow, and from 58% in 2008–2009 to 63% in 2016 in Q1 and 46% in 2008–2009 to 49% in 2016 in Ayrshire and Arran. Data on time trends in absolute values for HbA_{1c} and SBP were not directly comparable.

Smoking prevalence has declined, for example from 24% in 2005–2006 to 19% in 2016 in Glasgow, and from 19% in 2008–2009 to 17% in 2016 in Ayrshire and Arran. However, inequalities by socio-economic status in prevalence of smoking for the most-deprived compared with the least-deprived fifth of the population appear to have widened over time, with evidence of differences by sex, as summarized below:

- Glasgow and Lothian, OR 3.19 (95% CI 2.99–3.41) in this study vs. 2.78 (2.63–3.03) in 2005–2006 [8];
- Tayside, OR 3.19 (95% CI 2.76–3.69) in this study vs. 2.22 (1.89–2.63) in 2006 [9];

- Ayrshire and Arran, OR 2.65 (95% CI 2.16–3.26) in males and 3.16 (2.45–4.07) in females in this study vs. 2.07 (1.69–2.54) in males and 2.95 (2.27–3.83) in females in 2008–2009 [10].

Prevalence of cholesterol ≥ 5 mmol/l has remained approximately constant, for example 26% in Glasgow in both 2005–2006 and 2016. However, inequalities in prevalence of cholesterol ≥ 5 mmol/l by socio-economic status appear to have reversed in direction over time, as summarized below:

- Glasgow and Lothian, OR 0.86 (95% CI 0.82–0.91) in this study vs. 1.09 (1.02–1.16) in 2005–2006 [8];
- Tayside, OR 0.83 (95% CI 0.73–0.94) in this study vs. 1.12 (0.96–1.33) in 2006 [9].

<H1>Discussion

<H2>Principal findings

Crude prevalence of CVD risk factors remains high among all people with type 2 diabetes in Scotland. Socio-economic status continues to be inversely associated with prevalence of current smoking, BMI ≥ 30 kg/m² and HbA_{1c} ≥ 58 mmol/mol (7.5%). No evidence of an association was found with SBP ≥ 140 mmHg and there was a positive association between socio-economic status and total cholesterol ≥ 5 mmol/l. Age and sex were found to significantly modify the association between socio-economic status and prevalence of several CVD risk factors. Inequalities in smoking prevalence appear to have widened over time. Inequalities in prevalence of cholesterol ≥ 5 mmol/l appear to have changed direction over time, now favouring those in Q1 compared with Q5.

<H2>Comparison with previous studies outside Scotland

The findings of this study in terms of inequalities in glycaemic control by socio-economic status are consistent with studies from other countries. Unemployment was associated with significantly higher HbA_{1c} than among people who were employed in South Carolina

($P = 0.036$) [19]. Although there was no association between neighbourhood economic disadvantage and HbA_{1c}, individuals living in neighbourhoods with high social disorganization had higher HbA_{1c} than those living in areas with lower social disorganization in North Carolina ($P = 0.01$) [20]. A Canadian study reported higher mean HbA_{1c} in those living in poverty compared with those not living in poverty [60 mmol/mol (7.6%) and 53 mmol/mol (7.0%) respectively] [21]. These studies all had small sample sizes (358, 424 and 295 respectively), and enrolled people by convenience sampling, and are therefore likely to be underpowered and biased.

A study from Saudi Arabia (sample size 1111 with random sampling from three different cities) reported an OR for HbA_{1c} \geq 53 mmol/mol (7%) of 4.33 (95% CI 1.23–15.28) in the lowest household income category compared with the highest income category [22]. In a large ($n = 32\,638$) population-based Spanish study using electronic primary care records and adjusting for age and sex, the findings were similar to those in this study; OR for HbA_{1c} \geq 53 mmol/mol (7%) 1.19 (95% CI 1.12–1.27) for people with low compared with high income [23]. A study in Sweden reported an OR for HbA_{1c} \geq 42 mmol/mol (6%) of 1.43 (95% CI 1.15–1.79) for those with low compared with high income [24]. By contrast, a large study from China that included 104 hospitals representing all the major geographical regions of China reported OR for HbA_{1c} \geq 53 mmol/mol (7%) of 0.90 (95% CI 0.83–0.98) for the lowest compared with the highest income group after adjusting for age, sex, BMI, smoking, alcohol consumption, exercise, and diabetes duration [25]. The discrepancy in findings between the Chinese study and other studies is possibly because China is in a different phase of epidemiological transition [26].

Fewer studies have investigated inequalities in other risk factors in people with type 2 diabetes. Similar to the findings of this study, there was little evidence for inequalities by socio-economic status in BP in the previously described studies from South Carolina [19] and

from Spain [23]. However, the study from China reported that prevalence of BP $\geq 140/80$ mmHg was higher in the lowest compared with the highest income group (OR 1.16, 95% CI 1.07–1.27) and found no evidence of an association between income and cholesterol levels [25]. In contrast to the findings of this study, the Spanish study did not find an association between socio-economic status and smoking (OR 0.98, 95% CI 0.88–1.10) in the low compared with the high income group, although it did find a positive association between socio-economic status and cholesterol levels (LDL cholesterol ≥ 100 mg/dl OR 0.90, 95% CI 0.85–0.96) in the low- compared with the high-income group [23]. Smoking appears to be less strongly associated with socio-economic status in the Spanish population than in Scotland: in Spain 20% of the high-income group were current smokers compared with 14% of the low-income group, whereas smoking prevalence in Scotland was 8.8% of the highest socio-economic group (Q5) and 24% in the lowest socio-economic group (Q1). In contrast to our findings of a statistically significant positive association between socio-economic status and total cholesterol ≥ 5 mmol/l, the Swedish study found that prevalence of total cholesterol > 4.5 mmol/l was similar between income groups (OR 0.98, 95% CI 0.76–1.23 in the low- compared with the high-income group) [24]. The Swedish study was much smaller ($n = 5048$) than the current and confidence intervals overlap, and misclassification bias, as different cut-points were used, may have contributed to the discrepancy in findings

<H2>Strengths and limitations

The strengths of this study include the fact that population-based data were used from over a quarter of a million individuals, giving precise estimates of the association between deprivation and CVD risk factor prevalence. Previous studies in Scotland have been limited to regions and were based on data from a decade or more ago. The updated estimates include the effects of subsequent population-based interventions that are likely to have affected risk factor prevalence such as the QOF and the 2006 smoking ban.

Limitations include those arising from potential inaccuracies and missing data or variables in population-based registers and the fact that SIMD provides an area-based measure of deprivation that may not necessarily apply to individuals. Misclassification bias of both socio-economic status and risk factor prevalence may underestimate socio-economic inequalities in the prevalence of CVD risk factors among people with diabetes. There is also scope for a circular relationship given that SIMD includes a health component, although there is little evidence that removing the health component from SIMD markedly affects associations with health outcomes [27]. Previous work from our group indicated that approximately two-thirds of people with type 2 diabetes in Scotland in January 2016 received prescriptions for one or more treatments for diabetes [28]. Further analysis of those data showed the proportions receiving treatment in the most- and least-deprived quintiles, respectively, were 85% and 83% for anti-hypertensives and 79% and 75% for statins (S. McGurnaghan, personal communication, 2019).

<H2>External validity

The findings of this study are based on almost all people with diagnosed type 2 diabetes in Scotland in June 2016. Data on time trends of smoking and obesity prevalence by SIMD quintile in the general Scottish population are available from the Scottish Health Surveys, which report that prevalence of smoking in Q1/Q5 was 39%/15% in 2008 (crude OR 3.6) and 35%/11% in 2016 (crude OR 4.4) [29,30]. These data suggest that a pattern of widening of inequalities in smoking prevalence has occurred over time in the general population of Scotland, similar to that we report among people with type 2 diabetes. In the general population, inequalities in obesity appear to have also widened, whereas they have been approximately stable in those with type 2 diabetes [29,30]. Data on other CVD risk factors by SIMD quintile are not available from the Scottish Health Surveys.

Comparison of our findings with those of the previous literature suggest that the pattern of associations between socio-economic status and physiological risk factors among people with type 2 diabetes in this study are broadly consistent across developed countries with similar lifestyles, cultures and healthcare provision/access. The results of the associations between socio-economic status and behavioural risk factors such as smoking should not be extrapolated given the evidence of differing patterns between countries.

<H2>Conclusion

Prevalence of CVD risk factors remains high among people with type 2 diabetes in Scotland. Socio-economic deprivation is strongly positively associated with smoking and BMI $\geq 30 \text{ kg/m}^2$, modestly positively associated with $\text{HbA}_{1c} \geq 58 \text{ mmol/mol}$ (7.5%), and modestly negatively associated with cholesterol $\geq 5 \text{ mmol/l}$ with no evidence of an association with $\text{SBP} \geq 140 \text{ mmHg}$.

Further research should be carried out to investigate whether patterns of lifestyle and treatment including both prescription and adherence to medication to lower these risk factors are relevant to inequalities in CVD risk among people with diabetes. Effective approaches to reduce inequalities are required in addition to reducing prevalence of CVD risk factors across the whole population, particularly with regard to smoking cessation and weight management. The finding that age and sex modify the effect of socio-economic status could be used to target interventions to reduce inequalities.

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Competing interests

None declared.

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Author contributions

EW and SHW conceived the idea, designed the work and wrote the initial drafts of the work, SHW contributed to data acquisition, SHR contributed to cohort generation, EW conducted the analysis. All authors contributed to interpretation of data, drafting or revising the manuscript, approved the final version and agree to be accountable for all aspects of the work. SHW is the guarantor for the work.

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FIGURE 1 Adjusted odds ratios (ORs) and 95% confidence intervals for key cardiovascular disease (CVD) risk factors for the most deprived quintile compared with the least deprived

quintile of people with type 2 diabetes in Scotland in mid-2016. ORs were adjusted for age, sex, health board, history of CVD and duration of diabetes.

FIGURE 2 Adjusted odds ratios (ORs) and 95% confidence intervals (CI) for (a) current smoking, (b) $\text{BMI} \geq 30 \text{ kg/m}^2$, (c) $\text{HbA}_{1c} \geq 58 \text{ mmol/mol}$ (7.5%), (d) $\text{SBP} \geq 140 \text{ mmHg}$ and $\text{total cholesterol} \geq 5 \text{ mmol/l}$ for Q1 compared with Q5 of people with type 2 diabetes in Scotland in mid-2016. ‘All’ indicates the adjusted OR (and 95% CI) for the whole study population, which is also represented by the solid vertical line. The dotted line, where feasible to fit in the scale, represents the null OR (1.0) for reference.

Supporting Information

Additional Supporting Information may be found in the online version of this article.

Figure S1. Flow chart showing cohort selection and missing/improbable values.

Table 1. Characteristics and crude prevalence of cardiovascular disease risk factors among people with type 2 diabetes in Scotland

| | Socio-economic status (SIMD quintile) | | | | | All | <i>P</i> -value for trend |
|---|---------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------------------|
| | 1 | 2 | 3 | 4 | 5 | | |
| Total, <i>n</i> | 62 384 | 60 026 | 54 282 | 47 577 | 39 742 | 264 011 | – |
| Age, years (mean \pm SD) | 64.6 \pm 13.2 | 66.5 \pm 12.9 | 67.3 \pm 12.7 | 67.6 \pm 12.5 | 68.2 \pm 12.4 | 66.7 \pm 12.8 | < 0.001 |
| Male, % | 53 | 54 | 57 | 58 | 60 | 56 | < 0.001 |
| Diabetes duration, years (median; IQR) | 7.9; 3.8–13.1 | 8.2; 4.0–13.4 | 8.3; 4.0–13.5 | 8.2; 4.2–13.4 | 8.3; 4.1–13.5 | 8.2; 4.0–13.4 | < 0.001 |
| History of CVD, % | 51 | 51 | 50 | 49 | 47 | 50 | < 0.001 |
| Current smoker, % | 24 | 19 | 15 | 12 | 8.8 | 16 | < 0.001 |
| BMI \geq 30 kg/m ² , % | 62 | 60 | 58 | 55 | 49 | 58 | < 0.001 |
| HbA _{1c} \geq 58mmol/mol (7.5%), % | 44 | 43 | 42 | 42 | 40 | 42 | < 0.001 |
| SBP \geq 140 mmHg, % | 31 | 32 | 32 | 32 | 31 | 32 | < 0.001 |
| Total cholesterol \geq 5 mmol/l, % | 24 | 24 | 25 | 25 | 25 | 25 | 0.089 |

Characteristics and crude prevalence of cardiovascular disease (CVD) risk factors are shown for people with type 2 diabetes in Scotland in mid-2016 with Scottish Index of Multiple Deprivation (SIMD) data available, aged \leq 100 years and with neither missing nor implausible risk factor data. Data are stratified by deprivation quintile, with *P*-values for analysis of variance (ANOVA) tests for trends in the association with SIMD quintile in continuous variables and *P*-values for chi-squared tests for trends in the association with SIMD quintile in categorical variables.

Table 2. Adjusted odds ratios (and 95% confidence intervals) for key CVD risk factors for quintiles 1 to 4 compared with quintile 5 (the least deprived quintile) of people with type 2 diabetes in Scotland in mid-2016.

| | SIMD quintile (compared with quintile 5) | | | |
|---|--|------------------|------------------|------------------|
| | 1 | 2 | 3 | 4 |
| Current smoker | 3.08 (2.95–3.21) | 2.28 (2.19–2.38) | 1.81 (1.74–1.90) | 1.34 (1.28–1.40) |
| BMI \geq 30 kg/m ² | 1.48 (1.44–1.52) | 1.39 (1.36–1.43) | 1.33 (1.29–1.37) | 1.21 (1.18–1.24) |
| HbA _{1c} \geq 58 mmol/mol (7.5%) | 1.11 (1.08–1.15) | 1.09 (1.06–1.13) | 1.06 (1.03–1.09) | 1.07 (1.04–1.10) |
| SBP \geq 140 mmHg | 1.03 (1.00–1.06) | 1.05 (1.02–1.08) | 1.04 (1.01–1.07) | 1.05 (1.02–1.08) |
| Total cholesterol \geq 5 mmol/l | 0.87 (0.84–0.90) | 0.90 (0.87–0.93) | 0.96 (0.93–0.99) | 0.98 (0.95–1.02) |

Odds ratios were adjusted for age, sex, health board, history of cardiovascular disease and duration of diabetes.

SIMD, Scottish Index of Multiple Deprivation.

Current smoking

Obesity

HbA1C ≥ 58 mmol/mol

SBP ≥ 140 mmHg

Cholesterol ≥ 5 mmol/l

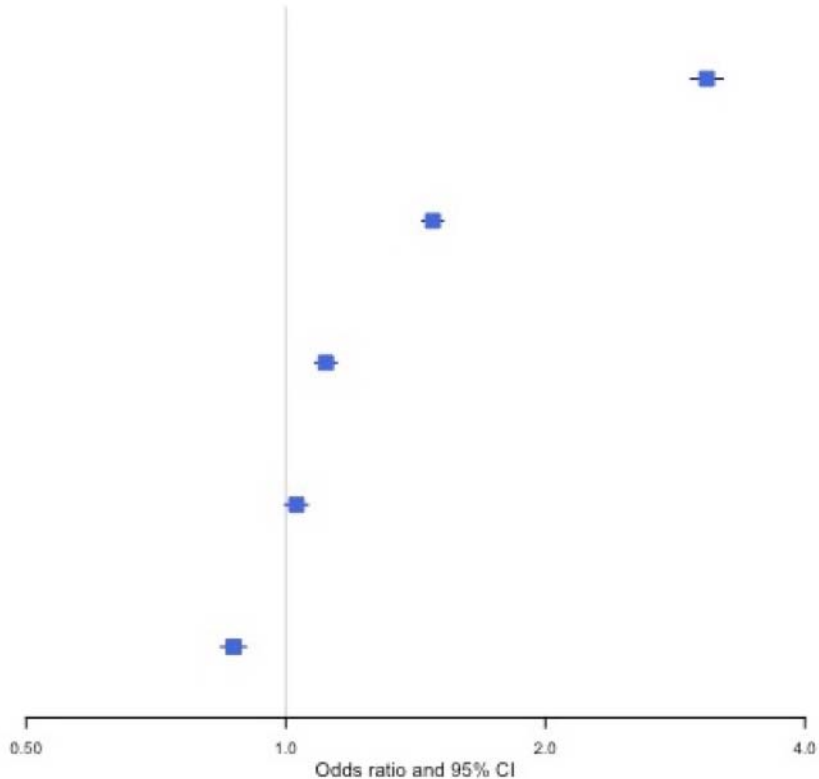
0.50

1.0

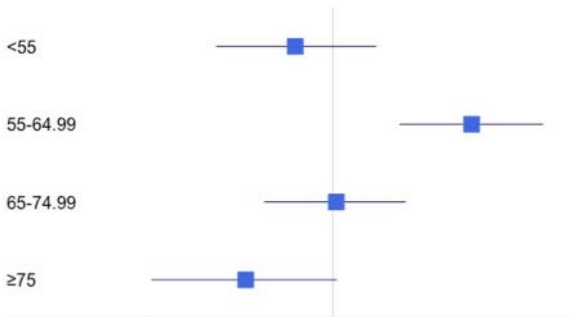
2.0

4.0

Odds ratio and 95% CI



Age (years)



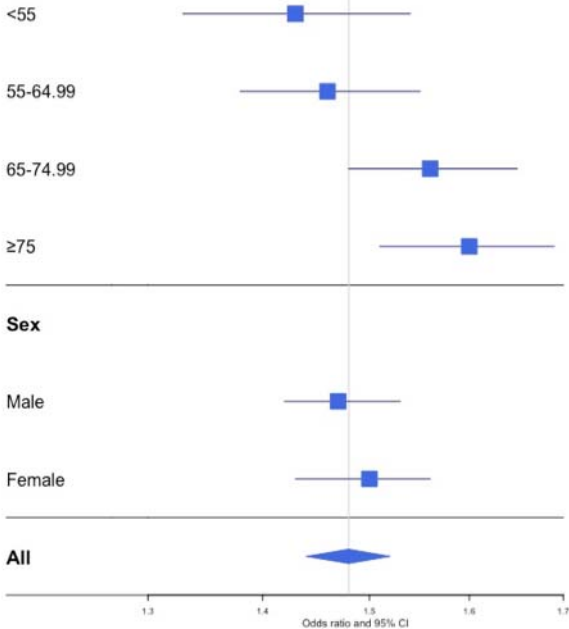
Sex



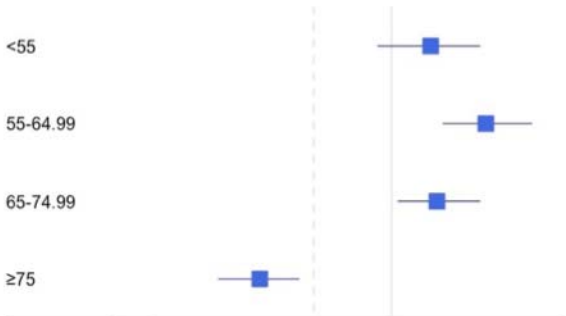
All



Age (years)



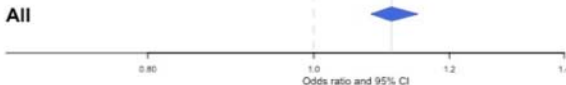
Age (years)



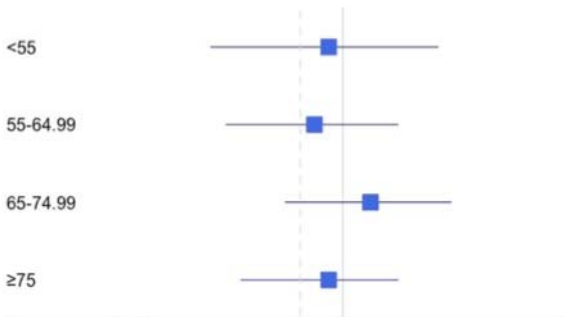
Sex



All



Age (years)



Sex



All



Age (years)

